Amendments to the Claims:

This listing of claims replaces all prior versions, and listings, of the claims in the application.

Listing of Claims:

Claim 1 (currently amended): A rotary assembly comprising a rotatable shaft; a sleeve journalled on the shaft and adapted to be stationary during rotation of the shaft; an earth vector sensor mounted for rotation with the shaft, the earth vector sensor being responsive to a given physical parameter in a direction substantially radial to the shaft; and an orientation signal generator which ~~comprises means for~~ generate<u>s</u>~~ing~~ a pulse train representing rotation of the shaft relative to the sleeve as a predetermined number of pulses per revolution, and ~~means for~~ derive<u>s</u>~~ing~~ from the pulse train and the output of the earth vector sensor the angle between the earth vector and a given position on the sleeve.

Claim 2 (currently amended): <u>A rotary assembly comprising a rotatable shaft; a sleeve journalled on the shaft and adapted to be stationary during rotation of the shaft; an earth vector sensor mounted for rotation with the shaft, the earth vector sensor being responsive to a given physical parameter in a direction substantially radial to the shaft; and an orientation signal generator which generates a pulse train representing rotation of the shaft relative to the sleeve as a predetermined number of pulses per revolution, and derives from the pulse train and the output of the earth vector sensor the angle between the earth vector and a given position on the sleeve, wherein</u> ~~A downhole assembly adapted to form part of a drill string and comprising a rotary assembly according to claim 1, and in which~~ the earth vector is the component ~~transverse to the drill string axis in the vicinity of the assembly~~ of the earth's <u>gravitational or magnetic field along an axis perpendicular to the shaft axis</u> ~~local magnetic field or gravitational field~~.

Claim 3 (currently amended): An assembly according to claim 1 or claim 2, in which the <u>orientation signal generator</u> ~~means for generating a pulse train~~ comprises a directional sensor arranged radially of the shaft and cooperating with a plurality of elements equispaced around the circumference of the sleeve <u>for generating the pulse train</u>.

Claim 4 (currently amended): An assembly according to claim 3, in which ~~said elements are ferromagnetic segments, and~~ the directional sensor is a coil and the plurality of elements are ferromagnetic segments that cooperate with the coil to generate the pulse train.

Claim 5 (original): An assembly according to claim 4, in which the ferromagnetic elements are 24 in number.

Claim 6 (currently amended): An assembly according to claim 2~~3~~, wherein the orientation signal generator comprises a directional sensor arranged radially of the shaft and cooperating with a plurality of elements equispaced around the circumference of the sleeve for generating the pulse train, and ~~in which said deriving means~~ operates to integrate the earth vector sensor output over each of a number of successive part-revolutions of the shaft to provide a series of simultaneous equations, and to solve these equations to provide an orientation angle for each of said plurality of elements with respect to the earth vector.

Claim 7 (original): An assembly according to claim 6, in which said part-revolutions are quarter revolutions.

Claim 8 (currently amended): An assembly according to claim 6, in which said simultaneous equations are as defined in equations (vi) to (ix) ~~above~~ below:

$$Q1=-K1.\sin\alpha+K1.\cos\alpha+K \quad \text{(vi)}$$

$$Q2=-K1.\sin\alpha-K1.\cos\alpha+K \quad \text{(vii)}$$

$$Q3=K1.\sin\alpha-K1.\cos\alpha+K \quad \text{(viii)}$$

$$Q4=K1.\sin\alpha+K1.\cos\alpha+K \quad \text{(ix)}.$$

Claim 9 (currently amended): A downhole assembly according to claim 2, in which the sleeve forms part of a gamma ray detector~~, the sleeve being apertured to permit~~ that detect~~ion of~~ gamma radiation strength transverse to the drill string axis.

Claim 10 (original): A method of sensing the angular position of a rotary assembly which comprises a rotatable shaft and a sleeve journalled on the shaft and adapted to be stationary during rotation of the shaft; the method comprising sensing an earth vector along an axis transverse to and rotating with the shaft, generating a pulse train representing rotation of the shaft relative to the sleeve as a predetermined number of pulses per revolution, and deriving

from the pulse train and the earth vector the angle between the earth vector and a given position on the sleeve.

Claim 11 (new): A rotary assembly comprising a rotatable shaft; a sleeve journalled on the shaft and adapted to be stationary during rotation of the shaft; an earth vector sensor mounted for rotation with the shaft, the earth vector sensor being responsive to a given physical parameter in a direction substantially radial to the shaft; and an orientation signal generator which comprises means for generating a pulse train representing rotation of the shaft relative to the sleeve as a predetermined number of pulses per revolution, and means for deriving from the pulse train and the output of the earth vector sensor the angle between the earth vector and a given position on the sleeve.